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109TH CONGRESS
2D SESSION

H. R. 5656

To provide for Federal energy research, development, demonstration, and commercial application activities, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JUNE 21, 2006

Mrs. BIGGERT (for herself, Mr. BOEHLERT, Mr. HALL, Mr. SMITH of Texas, Mr. CALVERT, Mr. EHLERS, Mr. INGLIS of South Carolina, and Mr. WAMP) introduced the following bill; which was referred to the Committee on Science

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A BILL

To provide for Federal energy research, development, demonstration, and commercial application activities, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Energy Research, Development, Demonstration, and Commercial Application Act of 2006''.

SEC. 2. DEFINITIONS.

For the purposes of this Act—

(1) the term ''biomass'' has the meaning given that term in section 932(a)(1) of the Energy Policy Act of 2005 (42 U.S.C. 16232(a)(1));

(2) the term ''cellulosic feedstock'' has the meaning given the term ''lignocellulosic feedstock'' in section 932(a)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16232(a)(2));

(3) the term ''engineering-scale'' means the minimum size required to predict with confidence all physical processes controlling the performance of a full-scale industrial facility;

(4) the term ''National Laboratory'' has the meaning given the term ''nonmilitary energy laboratory'' in section 903(3) of the Energy Policy Act of 2005 (42 U.S.C. 16182(3)); and

(5) the term ''Secretary''means the Secretary of Energy.

SEC. 3. FUTUREGEN.

(a) IN GENERAL.—The Secretary shall carry out a project to demonstrate the feasibility of the commercial application of advanced clean coal energy technology, including carbon capture and geological sequestration, for electricity generation.

(b) INDUSTRY INVOLVEMENT.—The Secretary may conduct the project through a financial assistance coopera-

tive agreement with a consortium of coal-fired power producers, coal companies, and other electric utility industry and mining industry participants

(c) REQUIREMENTS.—The Secretary shall design the project to ensure that—

(1) the project is operating by 2012;

(2) the project shall be able—

(A) to achieve at least a 99 percent reduction in sulfur dioxide emissions or, when burning coal containing 3 pounds or less of sulfur per million British thermal units, the project shall be able to emit no more than 0.03 pounds of sulfur dioxide emissions per million British thermal units of thermal energy produced by the project;

(B) to emit no more than 0.05 pounds of nitrogen oxide emissions per million British thermal units of thermal energy produced by the project;

(C) to achieve at least a 90 percent reduction in mercury emissions;

(D) to emit no more than 0.005 of total particulate emissions in the flue gas per million British thermal units of thermal energy produced by the project; and

(E) to achieve at least a 90 percent reduction in carbon dioxide emissions; and

(3) the project demonstrates the feasibility of electricity generation from coal using advanced clean coal technology with carbon capture and geological sequestration at a cost not greater than 10 percent higher than the average of all commercial integrated coal gasification combined cycle electric generating plants operating in the United States as of the date of enactment of this Act.

(d) COMMERCIALLY AVAILABLE ADVANCED CLEAN COAL TECHNOLOGY.—To reduce technical risk and focus development efforts on system integration, the Secretary shall, to the extent practicable, ensure that the project utilizes available advanced clean coal technology, such as coal gasification technology, for those components of the project where such technology would be appropriate.

(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

(1) $54,000,000 for fiscal year 2007;

(2) $112,000,000 for fiscal year 2008;

(3) $130,000,000 for fiscal year 2009;

(4) $95,000,000 for fiscal year 2010;

(5) $75,000,000 for fiscal year 2011; and

(6) $71,000,000 for fiscal year 2012.

SEC. 4. ADVANCED FUEL CYCLE TECHNOLOGIES FOR NUCLEAR POWER.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced nuclear fuel cycle technologies for generating electricity and industrial process heat from nuclear power, including technologies for spent fuel recycling, waste minimization, and reduction of radioactivity of final waste products.

(b) OBJECTIVES.—The Secretary shall design the program under this section to develop technologies that would—

(1) minimize the volume and heat load of high-level nuclear waste destined for storage in a geological repository to the extent that a single repository would be sufficient for storing all nuclear waste generated by United States commercial nuclear power plants during this century;

(2) increase the proliferation resistance of commercial nuclear power reactors and their associated fuel systems and infrastructure; and

(3) increase the amount of useful energy that can be extracted from nuclear fuel.

(c) SYSTEMS ANALYSIS.—

(1) IN GENERAL.—The Secretary shall develop a comprehensive modeling and simulation capability to enable a thorough analysis of possible advanced nuclear fuel cycle systems. The modeling and simulation capability shall be capable of examining—

(A) all of the components of each advanced nuclear fuel cycle system analyzed, including—

(i) spent fuel separations technologies;

(ii) advanced burner reactor technologies;

(iii) fuel fabrication technologies;

(iv) advanced thermal reactor technologies, including advanced thermal reactor designs that would be capable of reducing the toxicity or radioactivity of spent nuclear fuel components; and

(v) waste disposal technologies;

(B) the manner in which possible technology and engineering choices for individual components might affect the overall system, and how various system components would interact with one another; and

(C) quantitative mass flows of nuclear fuel and spent nuclear fuel, including projected inventories and transportation requirements for

nuclear fuel and spent nuclear fuel, for any examined system.

(2) ADVANCED NUCLEAR FUEL CYCLE SYSTEM PLAN.—

(A) ANALYSIS.—The Secretary shall conduct a thorough analysis of more than one possible configuration of an advanced nuclear fuel cycle system using the analytical capability developed under paragraph (1). Each possible advanced nuclear fuel cycle system configuration examined shall include both advanced burner reactors and advanced thermal reactors, and the analysis shall consider the degree to which each type of reactor could be utilized to reduce the toxicity or radioactivity of spent nuclear fuel components. The analysis of each possible configuration of an advanced nuclear fuel cycle system examined shall examine the compatibility of fuel cycle system components, including each of the system component technologies described in paragraph (1)(A), and the degree to which the examined system would meet the objectives described in subsection (b).

(B) PLAN.—Using the results of the analyses developed under subparagraph (A), and

not later than June 30, 2007, the Secretary shall develop a detailed plan for research, development, demonstration, and commercial application on advanced nuclear fuel cycle system technologies, including proposed technology options for each of the system component technologies described in paragraph (1)(A) and any proposed engineering-scale demonstrations of such system component technologies. The plan shall include an estimate of the design, engineering, construction and lifetime operating costs of any proposed engineering-scale demonstration. In developing the plan, the Secretary shall consider the integration into an advanced nuclear fuel cycle system of advanced thermal reactors capable of reducing the toxicity or radioactivity of spent nuclear fuel components.

(C) CONSULTATION.—In developing the plan under subparagraph (B), the Secretary shall consult with—

(i) technical experts from United States and foreign companies that design or engineer nuclear power plants or nuclear fuel reprocessing facilities;

(ii) technical experts from United States electric utilities that operate nuclear power plants;

(iii) economists with expertise in nuclear power and electricity markets;

(iv) the Nuclear Energy Research Advisory Committee;

(v) the Chairman of the Nuclear Regulatory Commission; and

(vi) the Administrator of the Environmental Protection Agency.

(3) NATIONAL ACADEMY OF SCIENCES REVIEW.—The Secretary shall enter into an arrangement with the National Academy of Sciences to conduct a review of the plan developed under paragraph (2)(B), including by reviewing the validity of the underlying analyses required in paragraph (2)(A).

(d) REPORT.—Not later than June 30, 2008, the Secretary shall transmit to Congress a report that includes the research, development, demonstration, and commercial application plan developed under subsection (c)(2)(B), the report from the National Academy of Sciences on the review conducted under subsection (c)(3), a revised research, development, demonstration, and commercial application plan that takes into account the findings, conclusions, and

recommendations of the report from the National Academy of Sciences, and an explanation of any instances where the Secretary does not concur with the findings, conclusions, and recommendations of the report from the National Academy of Sciences.

(e) PROHIBITION.—The Secretary shall not initiate detailed design or construction of any demonstration facility that is capable of processing 750 kilograms or more per year of nuclear fuel or spent nuclear fuel and that is designed to demonstrate the advanced nuclear fuel system component technologies described in subsection (c)(1)(A)(ii) and (iii) until 90 days after the report under subsection (d) has been transmitted to Congress.

(f) AUTHORIZATION OF APPROPRIATIONS.—

(1) ALLOCATIONS.—From amounts authorized to be appropriated under section 951(d)(1) of the Energy Policy Act of 2005 (42 U.S.C. 16271(d)(1)), there are authorized to be appropriated to the Secretary to carry out this section such sums as may be necessary for each of fiscal years 2007 through 2009.

(2) ADDITIONAL AMOUNTS.—There are authorized to be appropriated to the Secretary to carry out this section such sums as may be necessary for each of fiscal years 2010 through 2012.

SEC. 5. ADVANCED BATTERY TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced battery technologies for use in motor vehicles, particularly for plug-in hybrid electric vehicles.

(b) OBJECTIVE.—The Secretary shall design the program under this section to develop technologies that would enable a light-duty, plug-in hybrid electric vehicle to travel up to 40 miles on battery power alone.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

(1) $31,000,000 for fiscal year 2007;

(2) $34,100,000 for fiscal year 2008;

(3) $37,500,000 for fiscal year 2009; and

(4) $41,250,000 for fiscal year 2010.

(d) DEFINITION.—For purposes of this section, the term ''plug-in hybrid electric vehicle'' has the meaning given the term in section 10.

SEC. 6. ADVANCED BIOFUEL TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for production of liquid fuels from biomass.

(b) OBJECTIVES.—The Secretary shall design the program under this section to—

(1) develop technologies that would make ethanol produced from cellulosic feedstocks cost competitive with ethanol produced from corn by 2012;

(2) conduct research and development on how to apply advanced genetic engineering and bioengineering techniques to increase the efficiency and lower the cost of industrial-scale production of liquid fuels from cellulosic feedstocks; and

(3) conduct research and development on the production of hydrocarbons other than ethanol from biomass.

(c) AUTHORIZATION OF APPROPRIATIONS.—From amounts authorized to be appropriated under section 931(c) of the Energy Policy Act of 2005 (42 U.S.C. 16231(c)), there are authorized to be appropriated to the Secretary to carry out this section—

(1) $150,000,000 for fiscal year 2007;

(2) $160,000,000 for fiscal year 2008; and

(3) $175,000,000 for fiscal year 2009.

SEC. 7. ADVANCED HYDROGEN STORAGE TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for technologies to enable practical

onboard storage of hydrogen for use as a fuel for light-duty motor vehicles.

(b) OBJECTIVE.—The Secretary shall design the program under this section to develop practical hydrogen storage technologies that would enable a hydrogen-fueled light-duty motor vehicle to travel 300 miles before refueling.

(c) AUTHORIZATION OF APPROPRIATIONS.—In addition to amounts otherwise authorized to be appropriated, there are authorized to be appropriated to the Secretary to carry out this section—

(1) $46,000,000 for fiscal year 2007;

(2) $50,000,000 for fiscal year 2008;

(3) $55,000,000 for fiscal year 2009; and

(4) $60,000,000 for fiscal year 2010.

SEC. 8. ADVANCED SOLAR PHOTOVOLTAIC TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced solar photovoltaic technologies.

(b) OBJECTIVES.—The Secretary shall design the program under this section to develop technologies that would—

(1) make electricity generated by solar photovoltaic power cost-competitive by 2015; and

(2) enable the widespread use of solar photovoltaic power.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

(1) $148,000,000 for fiscal year 2007;

(2) $155,000,000 for fiscal year 2008;

(3) $165,000,000 for fiscal year 2009; and

(4) $180,000,000 for fiscal year 2010.

SEC. 9. ADVANCED WIND ENERGY TECHNOLOGIES.

(a) IN GENERAL.—The Secretary shall carry out a program of research, development, demonstration, and commercial application for advanced wind energy technologies.

(b) OBJECTIVES.—The Secretary shall design the program under this section to—

(1) improve the efficiency and lower the cost of wind turbines;

(2) minimize adverse environmental impacts; and

(3) develop new small-scale wind energy technologies for use in low wind speed environments.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section—

(1) $44,000,000 for fiscal year 2007;

(2) $48,400,000 for fiscal year 2008;

(3) $53,240,000 for fiscal year 2009; and

(4) $58,564,000 for fiscal year 2010.

SEC. 10. PLUG-IN HYBRID ELECTRIC VEHICLE TECHNOLOGY PROGRAM.

(a) SHORT TITLE.—This section may be cited as the ''Plug-In Hybrid Electric Vehicle Act of 2006''.

(b) DEFINITIONS.—In this section:

(1) BATTERY.—The term ''battery'' means a device or system for the electrochemical storage of energy.

(2) E85.—The term ''E85'' means a fuel blend containing 85 percent ethanol and 15 percent gasoline by volume.

(3) ELECTRIC DRIVE TRANSPORTATION TECHNOLOGY.—The term ''electric drive transportation technology'' means—

(A) vehicles that use an electric motor for all or part of their motive power and that may or may not use offboard electricity, including battery electric vehicles, fuel cell vehicles, hybrid electric vehicles, plug-in hybrid electric vehicles, flexible fuel plug-in hybrid electric vehicles, and electric rail; and

(B) related equipment, including electric equipment necessary to recharge a plug-in hybrid electric vehicle.

(4) FLEXIBLE FUEL PLUG-IN HYBRID ELECTRIC VEHICLE.—The term ''flexible fuel plug-in hybrid electric vehicle'' means a plug-in hybrid electric vehicle—

(A) warranted by its manufacturer as capable of operating on any combination of gasoline or E85 for its onboard internal combustion or heat engine; or

(B) that uses a fuel cell for battery charging when disconnected from offboard power sources.

(5) FUEL CELL VEHICLE.—The term ''fuel cell vehicle'' means an onroad vehicle that uses a fuel cell (as defined in section 803 of the Energy Policy Act of 2005 (42 U.S.C. 16152)).

(6) HYBRID ELECTRIC VEHICLE.—The term ''hybrid electric vehicle'' means a vehicle that—

(A) can be propelled using liquid combustible fuel and electric power provided by an onboard battery; and

(B) utilizes regenerative power capture technology to recover energy expended in brak-

ing the vehicle for use in recharging the battery.

(7) PLUG-IN HYBRID ELECTRIC VEHICLE.—The term ''plug-in hybrid electric vehicle'' means a hybrid electric onroad light-duty vehicle that can be propelled solely on electric power for a minimum of 20 miles under city driving conditions, and that is capable of recharging its battery from an offboard electricity source.

(c) PROGRAM.—The Secretary shall conduct a program of research, development, demonstration, and commercial application on technologies needed for the development of plug-in hybrid electric vehicles, including—

(1) high capacity, high efficiency batteries, to—

(A) improve battery life, energy storage capacity, and power delivery capacity, and lower cost; and

(B) minimize waste and hazardous material production in the entire value chain, including after the end of the useful life of the batteries;

(2) high efficiency onboard and offboard charging components;

(3) high power drive train systems for passenger and commercial vehicles and for supporting equipment;

(4) onboard energy management systems, power trains, and systems integration for plug-in hybrid electric vehicles, flexible fuel plug-in hybrid electric vehicles, and hybrid electric vehicles, including efficient cooling systems and systems that minimize the emissions profile of such vehicles; and

(5) lightweight materials, including research, development, demonstration, and commercial application to reduce the cost of materials such as steel alloys and carbon fibers.

(d) PLUG-IN HYBRID ELECTRIC VEHICLE DEMONSTRATION PROGRAM.—

(1) ESTABLISHMENT.—The Secretary shall establish a competitive grant pilot demonstration program to provide not more than 25 grants annually to State governments, local governments, metropolitan transportation authorities, or combinations thereof to carry out a project or projects for demonstration of plug-in hybrid electric vehicles.

(2) APPLICATIONS.—

(A) REQUIREMENTS.—The Secretary shall issue requirements for applying for grants

under the demonstration pilot program. The Secretary shall require that applications, at a minimum, include a description of how data will be—

(i) collected on the—

(I) performance of the vehicle or vehicles and the components, including the battery, energy management, and charging systems, under various driving speeds, trip ranges, traffic, and other driving conditions;

(II) costs of the vehicle or vehicles, including acquisition, operating, and maintenance costs, and how the project or projects will be self-sustaining after Federal assistance is completed; and

(III) emissions of the vehicle or vehicles, including greenhouse gases, and the amount of petroleum displaced as a result of the project or projects; and

(ii) summarized for dissemination to the Department, other grantees, and the public.

(B) PARTNERS.—An applicant under subparagraph (A) may carry out a project or projects under the pilot program in partnership with one or more private entities.

(3) SELECTION CRITERIA.—

(A) PREFERENCE.—When making awards under this subsection, the Secretary shall consider each applicant's previous experience involving plug-in hybrid electric vehicles and shall give preference to proposals that—

(i) provide the greatest demonstration per award dollar, with preference increasing as the number of miles that a plug-in hybrid electric vehicle can be propelled solely on electric power under city driving conditions increases; and

(ii) maximize the non-Federal share of project funding and demonstrate the greatest likelihood that each project proposed in the application will be maintained or expanded after Federal assistance under this subsection is completed.

(B) BREADTH OF DEMONSTRATIONS.—In awarding grants under this subsection, the Secretary shall ensure the program will dem-

onstrate plug-in hybrid electric vehicles under various circumstances, including—

(i) driving speeds;

(ii) trip ranges;

(iii) driving conditions;

(iv) climate conditions; and

(v) topography,

to optimize understanding and function of plug-in hybrid electric vehicles.

(4) PILOT PROJECT REQUIREMENTS.—

(A) SUBSEQUENT FUNDING.—An applicant that has received a grant in one year may apply for additional funds in subsequent years, but the Secretary shall not provide more than $10,000,000 in Federal assistance under the pilot program to any applicant for the period encompassing fiscal years 2007 through fiscal year 2011.

(B) INFORMATION.—The Secretary shall establish mechanisms to ensure that the information and knowledge gained by participants in the pilot program are shared among the pilot program participants and are available to other interested parties, including other applicants.

(5) AWARD AMOUNTS.—The Secretary shall determine grant amounts, but the maximum size of grants shall decline as the cost of producing plug-in hybrid electric vehicles declines or the cost of converting a hybrid electric vehicle to a plug-in hybrid electric vehicle declines.

(e) COST SHARING.—The Secretary shall carry out the program under this section in compliance with section 988(a) through (d) and section 989 of the Energy Policy Act of 2005 (42 U.S.C. 16352(a) through (d) and 16353).

(f) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary—

(1) for carrying out subsection (c), $250,000,000 for each of fiscal years 2007 through 2011, of which up to $50,000,000 may be used for the program described in paragraph (5) of that subsection; and

(2) for carrying out subsection (d), $50,000,000 for each of fiscal years 2007 through 2011.

SEC. 11. PHOTOVOLTAIC DEMONSTRATION PROGRAM.

(a) SHORT TITLE.—This section may be cited as the ''Solar Utilization Now Demonstration Act of 2006'' or the ''SUN Act of 2006''.

(b) IN GENERAL.—The Secretary shall establish a program of grants to States to demonstrate advanced photovoltaic technology.

(c) REQUIREMENTS.—

(1) ABILITY TO MEET REQUIREMENTS.—To receive funding under the program under this section, a State must submit a proposal that demonstrates, to the satisfaction of the Secretary, that the State will meet the requirements of subsection (g).

(2) COMPLIANCE WITH REQUIREMENTS.—If a State has received funding under this section for the preceding year, the State must demonstrate, to the satisfaction of the Secretary, that it complied with the requirements of subsection (g) in carrying out the program during that preceding year, and that it will do so in the future, before it can receive further funding under this section.

(3) FUNDING ALLOCATION.—Except as provided in subsection (d), each State submitting a proposal that meets the requirements under subsection (c) shall receive funding under the program based on the proportion of United States population in the State according to the 2000 census. In each fiscal year, the portion of funds attributable under this paragraph to States that have not submitted pro-

posals that meet the requirements under subsection (c) in the time and manner specified by the Secretary shall be distributed pro rata to the States that have submitted proposals that meet the requirements under subsection (c) in the specified time and manner.

(d) COMPETITION.—If more than $80,000,000 is available for the program under this section for any fiscal year, the Secretary shall allocate 75 percent of the total amount of funds available according to subsection (c)(3), and shall award the remaining 25 percent on a competitive basis to the States with the proposals the Secretary considers most likely to encourage the widespread adoption of photovoltaic technologies. In awarding funds under this subsection, the Secretary may give preference to proposals that would demonstrate the use of newer materials or technologies.

(e) PROPOSALS.—Not later than 6 months after the date of enactment of this Act, and in each subsequent fiscal year for the life of the program, the Secretary shall solicit proposals from the States to participate in the program under this section.

(f) COMPETITIVE CRITERIA.—In awarding funds in a competitive allocation under subsection (d), the Secretary shall consider—

(1) the likelihood of a proposal to encourage the demonstration of, or lower the costs of, advanced photovoltaic technologies; and

(2) the extent to which a proposal is likely to—

(A) maximize the amount of photovoltaics demonstrated;

(B) maximize the proportion of non-Federal cost share; and

(C) limit State administrative costs.

(g) STATE PROGRAM.—A program operated by a State with funding under this section shall provide competitive awards for the demonstration of advanced photovoltaic technologies. Each State program shall—

(1) require a contribution of at least 60 percent per award from non-Federal sources, which may include any combination of State, local, and private funds, except that at least 10 percent of the funding must be supplied by the State;

(2) limit awards for any single project to a maximum of $1,000,000;

(3) prohibit any nongovernmental recipient from receiving more than $1,000,000 per year;

(4) endeavor to fund recipients in the commercial, industrial, institutional, governmental, and residential sectors;

(5) limit State administrative costs to no more than 10 percent of the grant;

(6) report annually to the Secretary on—

(A) the amount of funds disbursed;

(B) the amount of photovoltaics purchased; and

(C) the results of the monitoring under paragraph (7);

(7) provide for measurement and verification of the output of a representative sample of the photovoltaics systems demonstrated throughout the average working life of the systems, or at least 20 years; and

(8) require that applicant buildings must have received an independent energy efficiency audit during the 6-month period preceding the filing of the application.

(h) UNEXPENDED FUNDS.—If a State fails to expend any funds received under subsection (c) or (d) within 3 years of receipt, such remaining funds shall be returned to the Treasury.

(i) REPORTS.—The Secretary shall report to Congress 5 years after funds are first distributed to the States under this section—

(1) the amount of photovoltaics demonstrated;

(2) the number of projects undertaken;

(3) the administrative costs of the program;

(4) the amount of funds that each State has not received because of a failure to submit a qualifying proposal, as described in subsection (c)(3);

(5) the results of the monitoring under subsection (g)(7); and

(6) the total amount of funds distributed, including a breakdown by State.

(j) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for the purposes of carrying out this section—

(1) $50,000,000 for fiscal year 2007;

(2) $100,000,000 for fiscal year 2008;

(3) $150,000,000 for fiscal year 2009;

(4) $200,000,000 for fiscal year 2010; and

(5) $300,000,000 for fiscal year 2011.

SEC. 12. ENERGY EFFICIENT BUILDING GRANT PROGRAM.

(a) ENERGY EFFICIENT BUILDING PILOT GRANT PROGRAM.—

(1) IN GENERAL.—Not later than 6 months after the date of enactment of this Act, the Secretary shall establish a pilot program to award grants to businesses and organizations for new construction of energy efficient buildings, or major ren-

ovations of buildings that will result in energy efficient buildings, to demonstrate innovative energy efficiency technologies, especially those sponsored by the Department of Energy.

(2) AWARDS.—The Secretary shall award grants under this subsection competitively to those applicants whose proposals—

(A) best demonstrate—

(i) likelihood to meet or exceed the standards referred to in subsection (b)(2);

(ii) likelihood to maximize cost-effective energy efficiency opportunities; and

(iii) advanced energy efficiency technologies; and

(B) are least likely to be realized without Federal assistance.

(3) AMOUNT OF GRANTS.—Grants under this subsection shall be for up to 50 percent of design and energy modeling costs, not to exceed $50,000 per building. No single grantee may be eligible for more than 3 grants per year under this program.

(4) GRANT PAYMENTS.—

(A) INITIAL PAYMENT.—The Secretary shall pay 50 percent of the total amount of the grant to grant recipients upon selection.

(B) REMAINDER OF PAYMENT.—The Secretary shall pay the remaining 50 percent of the grant only after independent certification that operational buildings are energy efficient buildings as defined in subsection (b).

(C) FAILURE TO COMPLY.—The Secretary shall not provide the remainder of the payment unless the building is certified within 6 months after operation of the completed building to meet the requirements described in subparagraph (B), or in the case of major renovations the building is certified within 6 months of the completion of the renovations.

(5) REPORT TO CONGRESS.—Not later than 3 years after awarding the first grant under this subsection, the Secretary shall transmit to Congress a report containing—

(A) the total number and dollar amount of grants awarded under this subsection; and

(B) an estimate of aggregate cost and energy savings enabled by the pilot program under this subsection.

(6) ADMINISTRATIVE EXPENSES.—Administrative expenses for the program under this subsection shall not exceed 10 percent of appropriated funds.

(b) DEFINITION OF ENERGY EFFICIENT BUILDING.—For purposes of this section the term ''energy efficient building'' means a building that—

(1) achieves a reduction in energy consumption of—

(A) at least 25 percent for new construction, compared to the energy standards set by the 2004 International Energy Conservation Code (in the case of residential buildings) or ASHRAE Standard 90.1–2004; or

(B) at least 20 percent for major renovations, compared to energy consumption before renovations are begun; and

(2) is constructed or renovated in accordance with the most current, appropriate, and applicable voluntary consensus standards, as determined by the Secretary, such as those listed in the assessment under section 914(b), or revised or developed under section 914(c), of the Energy Policy Act of 2005.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section $10,000,000 for each of the fiscal years 2008 through 2012.

SEC. 13. ENERGY EXTENSION.

(a) DEFINITIONS.—For purposes of this section:

(1) COOPERATIVE EXTENSION.—The term ''Cooperative Extension'' means the extension services established at the land-grant colleges and universities under the Smith-Lever Act of May 8, 1914.

(2) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(3) ENERGY SUPPLY RESEARCH AND DEVELOPMENT PROGRAMS.—The term ''energy supply research and development programs'' means the research, development, demonstration, and commercial application programs in the Office of Energy Efficiency and Renewable Energy, the Office of Electricity Delivery and Energy Reliability, and the Office of Fossil Energy.

(4) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given that term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

(5) LAND-GRANT COLLEGES AND UNIVERSITIES.—The term ''land-grant colleges and universities'' means—

(A) 1862 Institutions (as defined in section 2 of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7601));

(B) 1890 Institutions (as defined in section 2 of that Act); and

(C) 1994 Institutions (as defined in section 2 of that Act).

(b) IN GENERAL.—

(1) GRANTS.—The Secretary, through the energy supply research and development programs of the Department, shall carry out a program to award competitive, merit-reviewed grants to Cooperative Extension services or offices, States, local governments, institutions of higher education, and nonprofit institutions with expertise in energy research or extension, or consortia thereof, to conduct activities to transfer knowledge and information about advanced energy technologies that increase efficiency of energy use, especially those developed at the National Laboratories and by the Department, to individuals, businesses, nonprofit entities, and public entities, including local governments and school districts.

(2) REQUIREMENT.—To receive funding under this section, a grant applicant must already operate an outreach program capable of transferring knowledge and information about advanced energy technologies that increase efficiency of energy use, or

must partner with an entity that has such an outreach program.

(c) USES OF FUNDS.—Funds awarded under this section may be used for the following activities:

(1) Developing and distributing informational materials on technologies that could use energy more efficiently.

(2) Carrying out small-scale projects to demonstrate technologies that could use energy more efficiently.

(3) Developing and conducting seminars, workshops, long-distance learning sessions, and other activities to aid in the dissemination of knowledge and information on technologies that could use energy more efficiently.

(4) Providing or coordinating onsite energy evaluations for a wide range of energy end-users.

(5) Examining the energy efficiency needs of energy end-users to develop recommended research projects for the Department.

(6) Hiring experts in energy efficient technologies to carry out activities described in paragraphs (1) through (5).

(7) Carrying out any other activities the Secretary believes will accomplish the purposes described in subsection (b)(1).

(d) SELECTION PROCESS APPLICATION.—An applicant seeking funding under this section shall submit an application to the Secretary at such time, in such manner, and containing such information as the Secretary may require. The application shall include, at a minimum—

(1) a description of the applicant's current outreach program and of why it would be capable of transferring knowledge and information about advanced energy technologies that increase efficiency of energy use;

(2) a description of the activities the applicant would carry out, of the technologies that would be transferred, and of who would be carrying out those activities;

(3) a description of how the proposed activities would be appropriate to the specific energy needs of the area to be served;

(4) an estimate of the number and types of energy end-users expected to be reached through such activities; and

(5) a description of how the applicant will assess the success of the program.

(e) REVIEW OF APPLICATIONS.—In evaluating the applications submitted under this section, the Secretary shall consider, at a minimum—

(1) the ability of the applicant to effectively carry out the proposed program;

(2) the appropriateness of the applicant's outreach program for carrying out the program described in this section; and

(3) the likelihood that proposed activities could be expanded or used as a model for other areas.

(f) AWARDS.—

(1) DISTRIBUTION.—In making awards under this section, the Secretary shall ensure that, to the extent practicable, the program enables the transfer of knowledge and information about a variety of technologies and enables the transfer of knowledge and information in a variety of geographic areas.

(2) FOCUS.—In making awards under this section, the Secretary shall give priority to applicants that would significantly expand on or fill a gap in existing programs in a geographical region.

(g) COST SHARING.—The Secretary shall require cost-sharing in accordance with the requirements of section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) for commercial application activities.

(h) DURATION.—

(1) INITIAL GRANT PERIOD.—A grant awarded under this section shall be for a period of 5 years.

(2) INITIAL EVALUATION.—Each grantee under this section shall be evaluated during its third year of operation under procedures established by the Secretary to determine if the grantee is accomplishing the purposes of this section described in subsection (b)(1). The Secretary shall terminate any grant that does not receive a positive evaluation. If an evaluation is positive, the Secretary may extend the grant for 3 additional years beyond the original term of the grant.

(3) ADDITIONAL EXTENSION.—If a grantee receives an extension under paragraph (2), the grantee shall be evaluated again during the second year of the extension. The Secretary shall terminate any grant that does not receive a positive evaluation. If an evaluation is positive, the Secretary may extend the grant for a final additional period of 3 additional years beyond the original extension.

(4) LIMITATION.—No grantee may receive more than 11 years of support under this section without reapplying for support and competing against all other applicants seeking a grant at that time.

(i) TECHNICAL ASSISTANCE.—The Secretary and the National Laboratories may provide technical assistance on advanced energy technologies and methods to grantees.

(j) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary for carrying out this section—

(1) $25,000,000 for fiscal year 2008;

(2) $27,375,000 for fiscal year 2009;

(3) $30,000,000 for fiscal year 2010;

(4) $32,900,000 for fiscal year 2011; and

(5) $36,000,000 for fiscal year 2012.

SEC. 14. GREEN ENERGY EDUCATION.

(a) DEFINITION.—For the purposes of this section:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation.

(2) HIGH PERFORMANCE BUILDING.—The term ''high performance building'' has the meaning given that term in section 914(a) of the Energy Policy Act of 2005 (42 U.S.C. 16194(a)).

(b) GRADUATE TRAINING IN ENERGY RESEARCH AND DEVELOPMENT.—

(1) FUNDING.—In carrying out research, development, demonstration, and commercial application activities authorized for the Department of Energy, the Secretary may contribute funds to the National

Science Foundation for the Integrative Graduate Education and Research Traineeship program to support projects that enable graduate education related to such activities.

(2) CONSULTATION.—The Director shall consult with the Secretary when preparing solicitations and awarding grants for projects described in paragraph (1).

(c) CURRICULUM DEVELOPMENT FOR HIGH PERFORMANCE BUILDING DESIGN.—

(1) FUNDING.—In carrying out advanced energy technology research, development, demonstration, and commercial application activities authorized for the Department of Energy related to high performance buildings, the Secretary may contribute funds to curriculum development activities at the National Science Foundation for the purpose of improving undergraduate or graduate interdisciplinary engineering and architecture education related to the design and construction of high performance buildings, including development of curricula, of laboratory activities, of training practicums, or of design projects. A primary goal of curriculum development activities supported under this section shall be to improve the ability of engineers, architects, and plan-

ners to work together on the incorporation of advanced energy technologies during the design and construction of high performance buildings.

(2) CONSULTATION.—The Director shall consult with the Secretary when preparing solicitations and awarding grants for projects described in paragraph (1).

(3) PRIORITY.—In awarding grants with respect to which the Secretary has contributed funds under this subsection, the Director shall give priority to applications from departments, programs, or centers of a school of engineering that are partnered with schools, departments, or programs of design, architecture, and city, regional, or urban planning.

SEC. 15. ARPA–E STUDY.

(a) IN GENERAL.—The Secretary shall enter into an arrangement with the National Academy of Sciences to conduct a detailed study of, and make further recommendations on, the October 2005 National Academy of Sciences recommendation to establish an Advanced Research Projects Agency-Energy (in this section referred to as ARPA–E).

(b) REPORT.—Not later than 12 months after the date of enactment of this Act, the Secretary shall transmit to Congress the study described in subsection (a) and the

Secretary's response to the findings, conclusions, and recommendations of that study.

(c) TERMS OF REFERENCE.—The Secretary shall ensure that the study described in subsection (a) addresses the following questions:

(1) What basic research related to new energy technologies is occurring now, what entities are funding it, and what is preventing the results of that research from reaching the market?

(2) What economic evidence indicates that the limiting factor in the market penetration of new energy technologies is a lack of basic research on path-breaking new technologies? What barriers do those trying to develop new energy technologies face during later stages of research and development?

(3) To what extent is the Defense Advanced Research Projects Agency an appropriate model for an energy research agency, given that the Federal Government would not be the primary customer for its technology and where cost is an important concern?

(4) How would research and development sponsored by ARPA–E differ from research and development conducted by the National Laboratories or sponsored by the Department of Energy through the

Office of Science, the Office of Energy Efficiency and Renewable Energy, the Office of Fossil Energy, the Office of Electricity Delivery and Energy Reliability, and the Office of Nuclear Energy?

(5) Should industry or National Laboratories be recipients of ARPA–E grants? What institutional or organizational arrangements would be required to ensure that ARPA–E sponsors transformational, rather than incremental, research and development?

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